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AUTHOR Conrad, William H., III; Eller, Benjamin

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ABSTRACT

A descriptive research project was conducted to investigate how 57 public school districts in the United States used data-informed processes and data support tools like the Quality School Portfolio (QSP) to address key district questions. The research project was a partnership among the American Association of School Administrators, the National School Boards Foundation, and the National Center for Research on Evaluation, Standards, and Student Testing. The project used both survey and case study protocols (four case studies) to investigate school district data use. This paper discusses key themes identified in the study, which include focusing on data use to address student academic achievement and building the cultural, technical, and organizational capacities of school districts to use data. The paper also describes the challenges school districts face as they focus on data use. It makes recommendations to address these challenges and identifies questions for future research on data use to improve the decision-making process. (Contains 2 tables, 3 figures, and 11 references.) (SLD)

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ED 475 365

District Data-informed Decision Making

By
William H. Conrad, III
Benjamin Eller

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AMERICAN EDUCATIONAL RESEARCH ASSOCIATION
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Abstract

The Research Project was a descriptive Research Project that investigated how 57 public school districts in the United States used data-informed processes and data support tools like the Quality School Portfolio (QSP) to address key district questions. The Research Project was a partnership among the American Association of School Administrators (AASA), the National School Boards Foundation (NSBF), and the National Center for Research on Evaluation, Standards, and Student Testing (CRESST). The Research Project used both survey and case study protocols to investigate district data use. This paper discusses key themes identified in the study, which include focusing on data use to address student academic achievement and building the cultural, technical, and organizational capacities of school districts to use data. This paper describes the challenges school districts face as they focus on data use, makes recommendations to address these challenges, and identifies questions for future research on data use to improve the decision-making process.

> Our goal this year was to improve writing. We developed writing interventions and utilized the state assessment rubrics. Our goal was to make sure that 95% of our students were proficient or above on at least two out of four of the writing samples. We used a representative sample of students. Two assessors independently assessed writing samples. If there was a discrepancy, a third expert assessor would assess the paper. We used QSP and a modification suggested by a senior researcher at CRESST to include the quarterly writing data in an innovative system of assigning scores to years. We visualized the data that demonstrated improvement. Using the gauge chart of QSP, we demonstrated that our students almost reached the goal (Over 93% were proficient or above).
>
> **Assistant Principal**
> **School District A**

Introduction

This statement by the Assistant Principal at School District A exemplifies how schools use data and technology-rich data support tools like the Quality School Portfolio (QSP) to achieve measurable goals in student achievement. School District A was one participant in the District Data Use Research Project funded in partnership with the American Association for School Administrators (AASA), the National School Board Foundation (NSBF), and the National Center for Research on Evaluation Standards and Student Testing (CRESST). The purpose of this article is to describe the findings and interpretations of the Research Project. This article identifies key themes related to the ability of school districts to carry out data-informed district improvement. These themes focus on organizational data culture, data capacity, and technical data capacity.

Project Background

In 1999, AASA received a grant from the Department of Education to help school districts realize the potential of data-driven decision making in their schools and to enhance the way they use data to inform key strategic district questions. The grant money was used to fund the District Data Use Project, which involved two-day workshops for

school districts where they learned how to use data support tools in the context of their district improvement or strategic planning process. The use of a data support tool called the Quality School Portfolio (QSP) was integral to the workshops. QSP is a Windows-based application. Norm-referenced and criterion-referenced assessment data can be organized and visualized using QSP to inform key strategic district questions. Demographic and various student event data (e.g. attendance) can also be organized and visualized using QSP to inform key strategic district questions. School improvement teams can use QSP to create custom groups and combination groups in order to identify students who meet one or more selection criteria. QSP users can use the groupings to generate visualizations such as line graphs, stacked bar graphs, and scatter plots. A variety of crosstab tables and advanced tables can also be produced using QSP. These data visualizations aid data users in interpreting data to inform and answer key strategic district questions.

. AASA and CRESST organized the Project workshops over a three-year period and provided staff development for 57 school districts across the country. Each school district participating in the Project assembled a data team that included a school board member, the superintendent, a district project coordinator, and a variety of district data users. Both AASA and CRESST technical staff provided telephone and online support in the use of QSP or other data support tools to school districts after they participated in the workshops. In addition to the workshops, AASA planned and hosted several conferences over the three-year period in which data team members from school districts participating in the Project met to share how they were using QSP in the context of their district improvement process. Also as part of the Project, NSBF provided training and support

materials focusing on data use and questions that school boards could use to develop district improvement strategic plans as well as to inform school district policy.

Study Overview

In 2002, AASA asked CRESST to plan and implement the District Data Use Research Project (the Research Project) to determine to what extent school districts address the following three research questions.

1. How do school districts collect and organize data to answer key district questions?
2. How do school districts use data to answer key district questions?
3. How do school districts take action and present results based on data used to answer key district questions?

The CRESST team developed a research framework based upon the work of John Bransford and Barbara Means of the IBM K-12 Consulting Group (Bransford et al., 1998). The research framework included the three research questions (as noted previously), as well as question characteristics and performance levels for the three research questions. The CRESST team then used the framework to develop a research plan that included two protocols: a survey that included both selected response and open-ended questions and a case study that engaged four districts in an intensive interview process paralleling the survey design.

Methodology

Overview

Survey. Researchers from CRESST designed surveys that included questions aligned to the three research questions. The surveys collected information about the systems that school districts have in place to collect, organize, and visualize data; the questions school districts address using data; and some of the effects and consequences of data use.

Surveys were tailored to specific members of the district data team including one survey designed specifically for the superintendent, one survey designed specifically for the district project coordinator, and one survey designed specifically for data users including school board members. The survey data was collected and imported into data support tools (Excel and QSP), and then visualized for interpretation by the CRESST researchers.

Case Study. Four school districts identified by AASA and NSBF participated in the case study. These four school districts were all strong data users. The case study gathered information about data use by these school districts and the effects of data use in these school districts, including tracing effects down to the school and classroom levels, as appropriate. Participants in the case study were all users of QSP. The case study involved on-site interviews with data team members who were either primary or secondary users of QSP. Primary users are defined as those users who use QSP directly in the district decision-making process. Secondary users are defined as those users who use QSP to implement the district plan. The case study also involved the collection of artifacts from the school districts that were coded and analyzed using the research framework.

Research Sample

Survey. The sample for the survey study included data team members from all school districts staff-developed by AASA and NSBF who were using QSP and other data support tools (N= 57) at the time of the study. Within these school districts, respondents included the school district superintendent, district project coordinator or technology facilitator, and all members of the school district data team including school board members.

Case Study. School districts in the case study (N=4) were selected based on recommendations from AASA and NSBF. These school districts were recommended based on their innovative use of data and the willingness of each school district to volunteer for the study. For the purpose of this study, the school districts that participated in the case study will be identified in the following way.

1. School District A
2. School District B
3. School District C
4. School District D

Research Instrumentation

Survey. Questions were organized around major ideas that aligned with the research questions for the study. Three surveys were developed to meet the specific roles of subgroups participating in the study including the school district superintendent, the district project coordinator or technology facilitator, and all members of the district data team including school board members. Survey questions used either of three formats: selected response with five distracters, with one of the choices always providing the opportunity for the respondent to indicate "Does not apply;" categorical responses such as yes or no responses; and open-ended responses. The surveys were reviewed and approved by the Institutional Review Board of UCLA.

Case Study. The case study used interview questions developed by researchers at CRESST. The questions aligned with the three research questions of the study and were approved by the Institutional Review Board of UCLA. A series of individual on-site interviews were conducted with the school district data team including the following: the superintendent, the district project coordinator or technology facilitator, and other data users including school board members. Rubrics were developed that analyzed the

responses to determine the extent to which key areas of the research questions were addressed. These rubrics were built upon a framework of planning, implementation, and collection of results. Performance levels for each of the main areas of the rubric were developed by the research team and critiqued and refined by school district data teams.

The research team for the case study consisted of staff from CRESST, AASA, and NSBF. The school district project coordinator determined the school district data team.

Research Data Collection

Survey. Surveys along with a Consent to Participate in the Survey form, which was approved by the Institutional Review Board of UCLA, were sent to all school districts that participated in the District Data Use Project. Self-addressed stamped envelopes were also included with the surveys. Follow up calls were made to the school districts on a weekly basis to make sure that they understood the process and could complete the surveys in a timely fashion. Upon completion, surveys were mailed to CRESST where the data was entered into Excel spreadsheets for analysis. Open-ended responses were also entered into Excel.

Case Study. Interviews were conducted over a two-day period at each school district site. Interview responses were recorded on paper by the researcher during the interview. Interview data were then transcribed into Microsoft Word documents. These documents were returned in electronic and paper formats to each interviewee along with self-addressed stamped envelopes. The interviewee was given two weeks to review, edit, and return the documents to the CRESST offices.

Data from these transcriptions were then entered as "Information Nuggets" into Excel. Researchers coded these "Information Nuggets" based upon how they aligned with

the three research questions. For the purpose of this investigation, an information nugget represents a discrete statement of information or response to an interview question.

The Information Nuggets and their codes were merged using Microsoft' Word's mail merge features into a label format that was printed to labels. The labels contained the Information Nugget along with the school district name, research question, characteristic, performance level, and type of data user. The labels were then affixed to a colored note card that aligned to the type of data user. See Figure 1 for a sample of the printed labels used for the analysis.

Figure 1: Sample of label creating by merging an Information Nugget with school district information.

Data User: Assistant Principal

North Penn **06/17/02**

Our school administration demonstrated that the "Caught Being Good" Discipline intervention played a role in the reduction of disciplinary referrals at Pennfield and provided teachers with frequent (monthly) disciplinary reports.

Question 1
D6 **Implementation**

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Researchers created one poster for each research question. The poster included the research question, rubric characteristics and performance levels, and space to affix the colored note cards with the Information Nugget labels.

Research Analysis

Survey. The unit of analysis for the survey study was the school district. A system of weighted averages was used to fairly represent the participation of each of the school districts in the study because there were variable numbers of data users for each district. Weighted averages were used for the multiple data users within the data user category to represent selected response data for individual school districts. Additionally, overlap of some survey completion was identified for school district superintendents who also acted as the district project coordinators.

Categorical responses for the school districts were included in Excel. In the case of categorical variables where a yes responses could be recorded, a criterion of 50% for a yes response to a categorical variable was used to determine whether a categorical response would be included as representative of the data users for a given school district in the study.

Data were imported into Excel and QSP for analysis and data visualizations were created. Researchers constructed survey findings based upon these data visualizations. Data interpretations were aligned with the key research questions. Data from the open-ended questions of the survey were entered into Excel. The researchers coded the data to the research questions and then they coded the data to the characteristics and the performance levels of the study. Pivot tables and charts were used to visualize this data

quantitatively. Researchers developed findings based on the open-ended data visualizations. The findings also included specific examples of open-ended responses that supported or did not support the survey open-ended findings.

Case Study: Colored note cards containing Information Nugget labels were taped to one of the three posters. Each poster contained one of the three research questions. Each colored note card was taped to a poster based upon its alignment with a research question including the characteristics and performance levels associated with the research question. The completed posters with the colored note cards containing Information Nuggets allowed researchers to visualize how participants responded to each research question. These visualizations were used to develop the findings.

Researchers also developed quantitative Excel Pivot charts and tables that visualized alignment of the responses to the research questions based on predefined characteristics and performance levels associated with the research questions. Specific examples from the information nuggets were used to inform the findings.

Demographics of Participating School Districts

Fifty-seven (57) school districts participated in the District Data Use Research Project. Of these 57 school districts, 63% returned surveys to CRESST (N=36). The school districts participating in the survey component of the Research Project demonstrated the following demographic characteristics:

- Mostly suburban (54%)
- Medium-sized:1001-5000 students (34%)
- The three major respondent groups were superintendents (N=26), district project coordinators (N=27), or data users (N=96)
- The main groups of data users were school principals (N=23), teachers (N=21), and assistant superintendents (N=12)

- 11 school districts returned surveys from all three major respondent groups
- Respondents were relatively new to the Project and the use of data within their school districts with superintendents engaged with the Project for the longest average time of 16 months.
- Over half of the responding school districts (N=22) reported having participated in the AASA two-day training workshops.

Findings

Several themes emerged based on the survey and case study findings. These themes focused on building a data-informed school district culture, building organizational capacity, building, and building technical capacity. A discussion of each of these themes follows.

Theme 1: Building a Data-informed School District Culture: Supporting a culture of inquiry

The Research Project found evidence that school districts that use data to inform decision-making support a culture of inquiry. For example, the superintendent of School District D, identified three elements that were critical to creating a culture of data-informed improvement: fostering a spirit of inquiry, valuing openness and transparency to data, and ensuring humility in the use of data. This study found evidence supporting a culture of inquiry within school districts.

Evidence from the survey found that school districts support a culture of inquiry by encouraging data users to ask broad questions aligned to student achievement. Table 1 demonstrates that as school districts build a data-informed culture, they focus on questions aligned to outcomes and processes related to student achievement.

Table 1: **Which of the following questions did you address using data?**

Key Question with District data focus	Superintendent (Yes Response)	District Project Coordinator (Yes Response)	Data User (Yes Response)
To what extent did students achieve standards this year?	88.5% (N=23)	85.2% (N=23)	81.25% (N=26)
To what extent did students achieve standards over the past several years?	50% (N=13)	66.7% (N=18)	65.63% (N=21)
How effective were district programs in helping students achieve standards?	76.9% (N=20)	51.9% (N=14)	65.63% (N=21)
To what extent did various academic groups achieve standards?	65.4% (N=14)	66.7% (N= 18)	37.50% (N=12)
How effective was the district in identifying students at academic risk?	46.2% (N=12)	51.9% (N=14)	59.38% (N=19)

N = School District

The questions listed in Table 1 foster a spirit of inquiry by asking data users to reflect on key district questions related to student achievement and how data use might or might not be used to answer those questions. Table 1 demonstrates that data users from all three data team respondent types use data to address the questions. 50% or more of the respondents (in all but 2 instances) used data to inform the key district questions listed in Table 1. This high response rate (50% to 88.5%) indicates these school districts are building a data-informed school district culture by using data to answer key district questions.

Responses to the open-ended questions of the survey demonstrated that school districts that are fostering a data-informed school district culture support a culture of inquiry and that the primary focus of their inquiry process is on student academic achievement. A sample open-ended response from a district project coordinator follows:

> We use data to identify those students achieving below grade level who have not made more than one years expected progress in a year's time,

> those at or above grade level who have had a significant drop in achievement from one year to the next, and those achieving at or above grade level who would benefit from additional challenge.

In addition to the open-ended survey responses, responses by the case study participants supported a culture of inquiry. This section reports how case study school districts used data support tools to foster a data-informed school district culture by addressing student achievement in the following ways:

- Enhancement of traditional data-use patterns
- Innovations in the use of data
- Resolution of misconceptions

Enhancement of traditional data-use patterns. The infusion of data support tools like QSP into the traditional data-informed work of school districts enhanced the ability of school districts to build a data-informed school district culture. Traditionally, school districts created reports on large-scale assessment data like the Pennsylvania state test. School districts enhanced their use of this data by importing the data into QSP in order to improve the reports that were provided to the schools. The technology coordinator from District B described how he uses QSP to enhance his ability to produce data-informed reports for the schools.

> QSP is used by our district. I use QSP to create reports on the PSSA, New Standards Assessment, and the Quarterly Assessments. I provide these reports to our schools in order to improve their ability to use data in support of their school improvement plans.

School administrative staff also recognized how the QSP tool could be used to enhance systems that are currently in place. The assistant principal at a middle school in District A perceived how QSP could help better organize data

that currently resided in a district-level system. Her comment concerning a student information system called Pentamation follows.

> We have a district computer management system called Pentamation. This is administrative software. It is difficult to get data from this system that would be helpful to our school: Student names, IDs, attendance, and so on. It would be great if this system produced electronic files that could be imported into QSP. It would save us a great deal of time.

These responses illustrate how school districts can build a data-informed school district culture by enhancing traditional data-use patterns, either by generating data-informed reports or by providing electronic access to data.

Innovations in the use of data. School districts working to build a data-informed school district culture by supporting a culture of inquiry devised innovative ways to use student achievement data imported into QSP. District C collected assessment data from multiple sources. Central administrative staff developed an innovative system to bring the data from these multiple sources into QSP. Data users were better able to inform decisions using these multiple sources. The comment from an assistant superintendent from District C describes this initiative.

> We use multiple measures for assessment to diagnose student's gaps as well as strengths. The QSP tool is effective in helping us collect and visualize data from these multiple assessments.

Data support tools like QSP provided many opportunities for school districts to innovate in the ways that they used data to inform district questions. For example, School District A disaggregated school-based writing days in

ways that helped show how district schools achieved their goals in writing. School districts also used QSP to produce unique data reports that supported findings of school district projects, such as the Special Education Self Study in School District D.

Resolution of misconceptions. When building a data-informed school district culture, data integrity and unbiased data interpretation is critical. Data support tools like Excel and QSP can help school districts dispel misconceptions that staff maintains with regard to student academic achievement. For example, the principal of School District D and her staff did an analysis to determine anomalies between student scores on ITBS and assignment of grade-level status in literacy. This principal used data displays from Excel to help dispel the erroneous idea held by teachers that Title I students were the cause of a drop in reading scores. The principal's comments about resolving this misconception follow.

> The Excel spreadsheet showed how students in one class demonstrated improvement in reading achievement as measured by the Gates McGinnty Test even though they are Title I students or on Free and Reduced Lunch. I used this document with teachers to demonstrate that it is not necessarily Title 1 students or low SES students who "bring down reading scores.

An assistant principal of a middle school in District A was able to use data support tools to help dispel pursuit of solutions to unsubstantiated hypotheses made by teachers within the school. When building a data-informed school district culture, school district personnel have to move from "gut feelings" to data-informed statements. Her comment below describes the importance of using data to dispel unsubstantiated teacher hypotheses.

> Teachers and the union sometimes come to me with questions that begin: We have a feeling that..." Now teachers know that the data team and I will always use data to either corroborate or not corroborate the feelings. Teachers know that we will always respond with data and evidence in support or not in support of various teacher/union hypotheses."

This assistant principal from School District A described a specific example of how an erroneous teacher hypothesis was debunked using data. Her comments follow.

> Some of the middle schools considered dropping school visits by prospective 6th grade students during the school year. I used a student survey to demonstrate that students reported their actual school visit was the most important factor in helping them to adapt to the new middle school environment. Based on the data I allowed the program that facilitated the school visits by students to continue.

Findings from the Research Project support the concept that school districts use data support tools and data support a culture of inquiry that helps to dispel misconceptions or erroneous hypotheses within the context of inquiry. The case study provided examples of how a culture of inquiry allowed the school districts to support or not support guesses, hunches, or gut feelings that professional staff maintained about student academic achievement.

Building Organizational Capacity

Leadership. The study also found that leadership at all levels plays a key role in building the organizational capacity to systematically use of data within school districts. Leadership at the school board level is especially effective in promoting the system-wide use of data. School board leadership in the use of data produces system-wide opportunities to plan data systems, use data, and produce results that help the district achieve strategic goals. From interview responses, it is clear that school boards set expectations for data-driven decision making. For example, the school board in School

District C created an expectation that all proposals presented to them would be supported by data. This school board also developed the expectation that they receive quarterly data-informed reports about student improvement in academic achievement. A school board member from School District C provided the following comment concerning its commitment to support data-informed district improvement.

> "Administrative requests now can be characterized by the following questions by the Board:
> 1) What data supports the need for this request?
> 2) What plan do you have to use data to monitor the success of this program in achieving district goals?"

Leadership at the administrative level is critical in supporting data use throughout a school district. A central administrator of School District A explained, "As a result of the frequent assessing correlate required by the district, the schools have woven a dependence on data into their culture." To support this culture of data-driven decision making, the central administrative staff in School District A provided leadership in the use of data within the district. Administrative staff of School District A demonstrated leadership when they regularly used data to support proposals they brought before the school board. The superintendent of School District A demonstrated leadership when he created an accountability task force with members from the district and school professional staff. The charge of this task force was to develop a data-informed accountability system.

> "One key purpose of the Accountability Task Force will be to develop a plan to focus on both measurable elements of student achievement (Pennsylvania State Standards Assessment, district-level tests) and other performance factors (attendance, drop-out rates, discipline referrals, course-taking sequence, etc.) in order to provide a complete picture of the district's performance."

The vision to establish a data-driven task force that supports decision making followed by the action of creating the task force by the superintendent demonstrates leadership in the use of data at the administrative level.

According to interview responses, the superintendent of School District D worked side-by-side with central administrative and school staff to enter local student reading assessment data so that it could be organized and interpreted for an upcoming school board meeting. The willingness to do what it takes to prepare the data even by the superintendent shows leadership at the administrative level and sends a strong message to all professional staff in the school district that the use of data by the school district is important and that all members of the school district are expected to have an active role in using data.

Leadership at the school level within districts is critical in developing models that can then be used district-wide. For example, the assistant principal of a middle school in School District A conducted numerous school-wide data-informed initiatives to achieve school-wide writing improvement goals. She demonstrated leadership when she helped three teachers within her building plan, and then implement data-informed action research projects within their classrooms as part of their professional evaluation. As a result of this principal's leadership, teachers and staff at her school experienced the effectiveness of using data to drive instruction; staff now has a concrete understanding of the expectation on the part of the school board and the administration for data-driven decision making. The model developed for data-informed action research projects at the school level can be expanded to other schools, helping staff at those schools to understand the effective use of data.

Staff Development. Staff development is a key characteristic for building the organizational capacity for school districts to effectively develop and use systems to collect and organize data to inform key district questions. In order to effectively collect, organize and visualize data in support of key district questions, the district needs to plan and implement effective staff development. Respondents responded to the following survey statements: Staff development provided by the school district has been helpful in using data and Staff development provided by AASA has been helpful in using data. Respondents used one of the following choices: Strongly Agree, Agree, Disagree, Strongly Disagree or Don't Know selected response. Data was weighted and then averaged. Figure 2 shows district user perceptions concerning the effectiveness of both district and AASA staff development initiatives.

Figure 2
Staff development provided by the School District and AASA has been helpful in using data

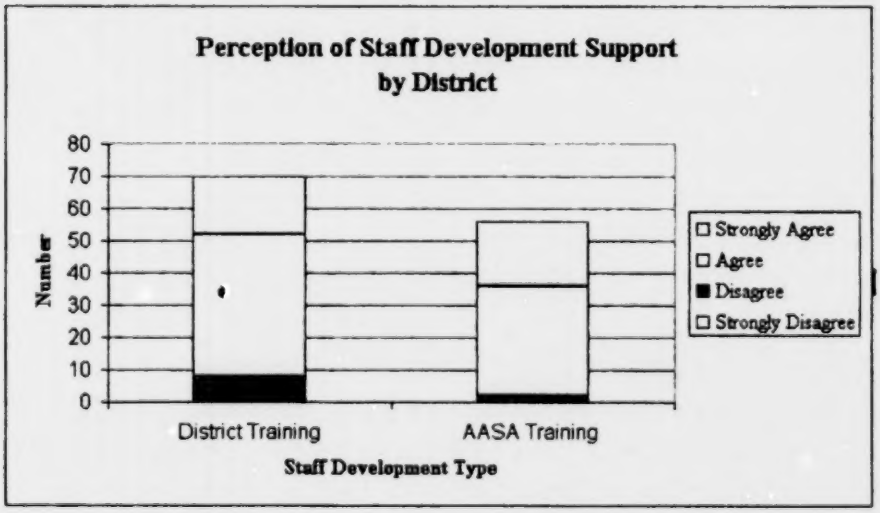


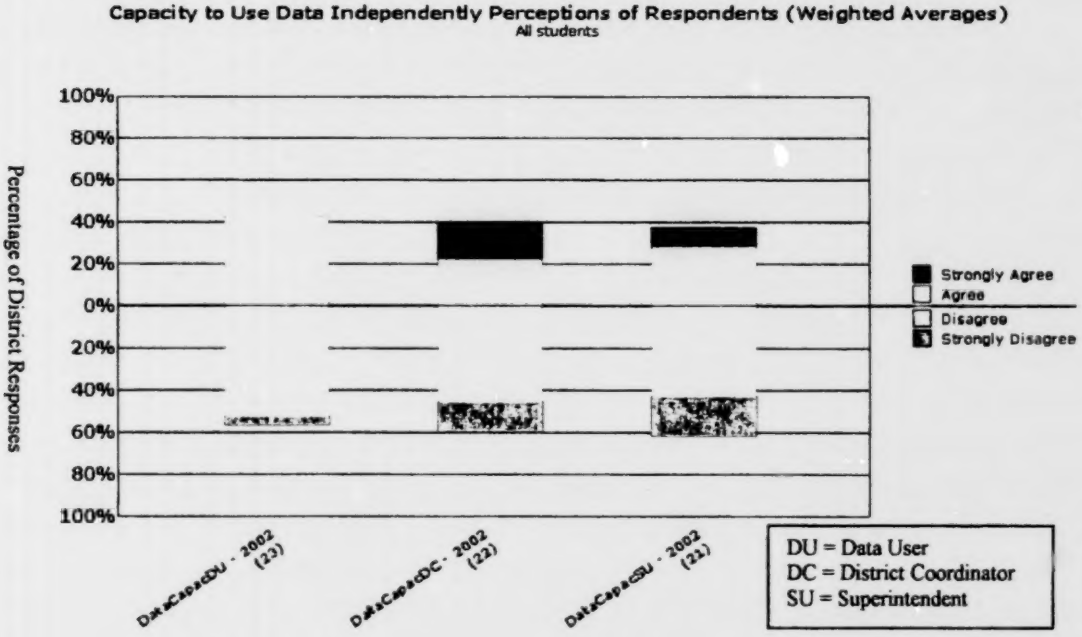
Figure 2 shows school districts perceptions by all types of respondents concerning the success or lack of success of data use staff development initiatives provided by the school

district and by AASA. School Districts showed satisfaction with the staff development provided by both.

While survey respondents were generally satisfied with staff development in the use of data, they were less confident concerning the capacity of their school districts to use data independently. Respondents responded to the following survey statement: Our district has the capacity to use data independently without outside support. Respondents selected from the following choices: Strongly Agree, Agree, Disagree, Strongly Disagree or Don't Know selected response.

Figure 3

Our district has the capacity to use data independently without outside support.



From the perspective of all district personnel, well over half questioned the capacity of their districts to use data independently despite having participated in both AASA and local District Data Use staff development opportunities.

The Research Project found that organizational leadership at all levels (school board to teacher) and staff development are essential to build organization capacity for data use. It cannot be assumed, however, that those two factors alone will build organizational capacity to use data independently.

The Role of Organizational Systems for Using Data. Organizational approaches to district improvement that use data-informed inquiry approaches to improvement are well supported. (Bernhardt, 1998; Shmoker; 1999). Senge (2000) describes how schools can use a business model of a data-informed systemic approach to produce school improvement results. Cromey (2000) describes how the work of the North Central Regional Education Laboratories (NCREL) was successful in helping school districts in Illinois and Wisconsin use data-informed and technology-rich processes to achieve strategic goals.

This Research Project found that organizational systems for using data are essential for building organizational capacity. Case study school districts demonstrated several unique organizational systems for data use. For example, the democratic and data-informed district council model in School District D represents an organizational structure approved by the school board that supports the systemic use of data to support initiatives to address the needs of the school district. The district council consists of voting members from the schools and community and non-voting members from the school board. Members of the council bring data-informed pre-proposals before the council to address specific needs. The council then votes to determine whether the proposal should be developed fully. If the pre-proposal receives four council member votes, the team can then develop a full proposal to present before the council. The full

proposal must also provide data that supports the need for the proposal; data to monitor the intervention; and the data that is used to judge the success of the intervention. The superintendent takes proposals that win a majority vote to the school board for their consideration. The use of the district council as an organizational system helps build School District D's organizational capacity to use data.

The administration of School District C used an innovative model developed in Texas called the Instructional Focus model to infuse data-informed decision making into all of the schools within School District C. During the interview process, an assistant superintendent described how School District C plans to address student achievement through the use of the Instructional Focus model by establishing instructional foci based on student academic need. The comment made by the assistant superintendent exemplifies how School District C created an organizational system to build organizational capacity to use data in support of student achievement.

> Schools use the data from standardized assessments to develop one instructional target in reading, writing and mathematics. Each grade level team used data to establish an instructional target and developed local assessments to determine to what extent students achieved the target over the course of the school year. Students were then identified as needing enrichment, reinforcement, remediation, re-teaching, or tutorials. Grade level teams used local assessments and data to continuously monitor the success of individual students and then regroup as necessary. Schools used the local assessment data to assess grade-level and school achievement of the instructional targets.

The Research Project found two models that school districts used to establish organizational systems to use data. These models are the broad use of data model and the deep and multi level model.

BROAD USE OF DATA MODEL. In the broad use of data model, school districts organize to collect data broadly across the district. School District B uses the broad use of data model when it collects New Standards Reference Exam data across all grade levels within the district.

Large-scale assessment data was available to all districts in the case study. Collection, organization, and analysis of this kind of assessment data across the district is common in the broad use of data model.. For example, School District A collected reading data from elementary schools throughout the district. The comment that follows from the assistant superintendent typifies the broad collection of data across the district.

> "We administer the Integrated Performance Assessments (IPA), which are extensive reading and writing assessments that are administered four times a year in all of our elementary schools. The classroom teachers score these tests and the results are submitted and tabulated."

DEEP AND MULTI-LEVEL USE OF DATA MODEL. In the deep and multi-level use of data model, data collection can also be deeper and more focused. School District D uses the deep and multi-level use of data model when it collects data across multiple levels of the organization as part of the Special Education Self-Study Project. School District A collected data within the context of an organizational system that was deep and engaged multiple levels of the school community. At each of its schools, the central administration established an Effective Schools Program that involved staff in the participation in various Effective Schools teams. One of the teams was the Frequent Monitoring Team that provided all of the other teams with data to support their work. The assistant principal described their Effective Schools Program at the middle school in the following comment.

> We are a pilot school for the Effective Schools Program. As a part of this program, teams studied how moving a study support program from the lunch period to eighth period was more effective for students. Again, the Frequent Monitoring Team used teacher survey data to demonstrate from a teacher perspective that the 8th period study support program was effective in helping students improve their focus on academic achievement. The survey used questions like: Is the library accessible? Did student behavior improve? Our team provided data supporting improvement in student behavior. Based on the survey our school made adjustments to the schedule in order to remedy some of the problems that were identified.

This Research Project found that the theme of building organizational capacity is critical for school districts that want to use technology-rich and data-informed processes for school/district improvement. Leadership at all levels within the organization plays a key role in driving data informed improvement. Both internally and externally driven staff development are organizational characteristics that support data-informed improvement. Yet even with staff development support, school districts in the project felt that they did not have the capacity to work with data independently. Districts used two organizational models to support their data-informed initiatives. They used a Broad Use of Data Model that collected data across the district and they used a Multi-level Model of data collection that focused on a deep use of data at multiple levels within the organization and also in conjunction with a focused project.

Theme 3: Building Technical Capacity

Using data in the context of school and district improvement means that school districts need the technical capacity to collect, organize, and visualize data in ways that will support an inquiry process to improve student academic achievement. Traditional methods of collecting, organizing, and visualizing data use paper, pencil, and highlighters to identify areas of strengths and weaknesses in charts provided by state boards of

education or testing companies. Question-driven improvement is often limited by these paper reports and the ability of staff to find patterns within these reports.

Since the signing of the *No Child Left Behind Law*, data has become a main focus for this country's schools (U.S. Department of Education, 2001). Technology plays a key role in helping school districts and schools look at and disaggregate data for determining student academic achievement at various levels within schools. Technology tools are becoming more commonplace and even necessary for schools and teachers who want to use data-informed processes to inform improvement in student achievement. (Baker, E. L., & Herman, J. L. in press; Mayer, R. E. 2001; Mitchell, D. 2001). Research supports the effectiveness of technology in collecting student assessment data. Lee and Eller (2001) reported on the effectiveness of a data support tool called the Quality School Portfolio (QSP) in helping schools use a data-informed process to achieve their school improvement goals. Of course, implementation of this technology must also be routinely reviewed and evaluated to ensure maximum usage and benefits (Baker & Herman; In Press).

Technology data support tools like QSP allow educators to ask a variety of questions about student academic achievement and then use the point and click grouping and reporting functions of QSP to help inform the questions. The technical capacity to use QSP means that educators have the hardware necessary to use QSP software; the technical capacity to prepare data for import into QSP, import data into QSP, export data from QSP, and use the key grouping, report and goal setting functions of QSP.

The availability of technology-rich data support tools like QSP means that school districts enhance their ability to use a wide variety of data in support of district improvement. Table 2 identifies the percentage of school districts that include data related to both academic and non-academic areas in data support tools like QSP.

Table 2:
What data are currently in the decision-support tools such as QSP?

Data Area	%	N
Student background (demographics)	92.6	25
Achievement or standard-based data from state	81.5	22
Achievement or standard-based data from district	77.8	21
Program participation - funded programs	77.8	21
Student attendance	70.4	19
Student grades	48.1	13
Student behavior	40.7	11
ACT/SAT data	37	10
Program participation - special district or school initiatives	37	10
School or district wide progress tests	29.6	8
Student preschool participation	25.9	7
Diagnostic or placement tests	18.5	5
Curriculum embedded	18.5	5
Transportation information	18.5	5
Student post graduation plans/placement	14.8	4
Student volunteer or service learning data	11.1	3
Other	3.7	1

Table 2 shows that school districts have some but not extensive electronic access to basic student demographic information and large-scale assessment data. The availability of electronic data enhances the ability of district staff to ask key questions that can be informed by the data. For example, 92.6% of respondents report that student demographic information is in data support tools such as QSP and 81.5% of the respondents report that they include achievement or standards-based data from the state into data support tools like QSP. The ACT/SAT percentage of only 37% reflects a lower percentage of high schools reporting use of QSP compared to the overall respondents. However, as indicated in Table 2, school districts report that they include less electronic

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access to non-academic data and classroom level tests. In order to support a culture of inquiry, school districts must continue to build their technical capacity to use data by expanding access to data.

All of the case study school districts collected and used large-scale student assessment data and to some extent local assessment data prior to participating in the Project. By participating in the 2-day AASA training, school district data teams learned how to use the data support tool QSP and other data support tools to more effectively collect, organize, and visualize their data to address key district questions. These technology tools enhanced the ability of school districts to use data.

The Special Education Self-Study Project carried out in School District D is an example of how a district used a system-wide committee approach and data support tools to address a variety of issues related to student achievement. QSP played a key role in helping the committee collect, organize, and visualize data from a variety of sources in order to systematically study student achievement throughout the school district. The director of Special Education who led the project commented on the importance of building technical capacity by using data support tools such as QSP in analyzing student assessment data as follows.

> Even though we did not get the Data Point software that was a part of the National Study of School Evaluation Process (NESSE) due to its high cost, our ability to use QSP gave us the data analysis component of the NESSE process. We would have abandoned the NESSE process if we were not able to use QSP to collect data and do the data analyses – especially related to student academic achievement. I feel that the need to incorporate data analysis into the NESSE process was a key factor in using QSP. The need drove the use of QSP.

This case study component of the Research Project found that the school districts incorporated the use of the QSP tool and other data support tool to build district technical

capacity by using two models: the data expert model and the distributed technical expertise model.

DATA EXPERT MODEL. In the data expert model, an individual who has expertise in the use of district data prepares and communicates a variety of reports of both a standard and requested type. The assistant superintendent of School District C actively hired a staff member that had both technical and statistical expertise. The data expert for School District C was well respected within the school district community for his ability to produce data reports to inform school-based initiatives. The comment that follows by the School District C data expert demonstrates his ability to work effectively with district staff.

> The availability of a data person such as myself at the district level is very important to provide our schools with local data in a timely fashion. We now need to build the capacity of our local schools to use data.

The data experts in a school district also become the champions of data use within the district. They help to build the technical capacity by developing workshops on using data support tools. Through these workshops and the data use support provided by the data experts, school districts could use data in a timely fashion to inform decisions at both the school and the district levels.

DISTRIBUTED TECHNICAL EXPERTISE MODEL. In the distributed technical expertise model, school districts would delegate the responsibility for using data to the individual schools. For example, District C provided data reports to schools from the data expert but it also expected each of the schools to have a data team that would use data to develop

instructional targets and monitor student achievement in attaining the targets. School District A trained a data team at the school level to use data-informed processes for school improvement. Central administration from District A then built technical capacity by using these school pilot sites to help train the other schools in the use of data-informed school improvement.

The most robust example of the distributed technical expertise model, can be found at School District A, which established Frequent Monitoring Correlate Teams within each of their schools as part of their Effective Schools initiative, The Frequent Monitoring Correlate Team at a school provided data reports to other school teams who were pursuing the achievement of specific data-informed goals. The assistant principal at one of the middle schools described the work of the Frequent Monitoring Correlate Team in the following way.

> There are seven other teams at the school that depend upon the data provided by the Frequent Monitoring Correlate Team. The Safe and Orderly team actually asked the Frequent Monitoring Correlate Team to help them develop a survey to determine staff and student safety knowledge. The team helped with the survey, data collection, visualization, and interpretation.

The distributed technology expertise model was not used as frequently in the Research Project as the data expert model was used. School District C used both models in its plan to use data-informed improvement. The data expert in School District C recognized the need to distribute technical expertise to the schools because the Instructional Focus initiative of the school district was beginning to tax his ability to provide school-specific data reports to schools in a timely fashion. The Research Project found that districts who are new to the use of data tend to establish a centralized data expert within the school

district before they engage in distributing this technical capacity to schools. Building technical capacity requires districts to build support for data use through the data expert model before expanding technical capacity through the distributed technology expertise model.

Challenges

The process of accessing and using data is a complex, energy intensive, and difficult task. Researchers, led by Norm Webb from the Wisconsin Center for Educational Research (Mason, 2001), reported on the challenges that several Milwaukee public schools encountered in trying to build both technical and organizational capacities to use data in support of informing key strategic decisions (Mason, 2001). In her research with the Milwaukee public schools, Mason identified 6 challenges that school districts face in using data to support school improvement.

1. Cultivating the desire to transform data into knowledge;
2. Focusing on a process for planned data use;
3. Making a commitment to acquire data;
4. Organizing data management;
5. Developing analytical capacity; and
6. Strategically applying information and results.

As emphasized throughout this discussion, the infusion of data-informed decision making into school districts is a difficult task. School districts who participated in the Research Project achieved many successes. Yet despite the many successes, districts also faced many challenges in infusing data-informed processes into their organizations. This section discusses the challenges faced by school districts. The subsequent section discusses recommendations designed to address the challenges.

Creating a Culture of Data-Informed Improvement

One superintendent reflected on the components of the culture required within school organizations to nurture and enhance data-informed decision making. He characterized data-informed school districts as having three essential cultural elements: a spirit of inquiry, openness and transparency to data, and humility.

Evidence of a spirit of inquiry is evidenced by the work of School District D in its inquiry into drop out rates in the school district and by the work of School District B in its efforts to explore student participation in AP classes. The energy and organizational focus required to maintain a system-wide focus on inquiry is enormous. It is easy for districts to relegate inquiry to the pursuit of trivial questions or only to some elements within the organization, or not at all. Strong inquiry initiatives such as the ones previously described in this article represent models that can be replicated by other school districts.

Fostering and maintaining an openness and transparency to data is another challenge faced by school districts. The use of data-informed processes is not a panacea for guaranteed success. There are times when the data does not support district interventions or initiatives. School districts must be willing to present the data and information and also be ready to make mid-course corrections that may not be politically correct. School District C conducted a data-informed evaluation of three computer-based reading programs. Assessment data did not support the effectiveness of these programs in improving student reading achievement. Yet School District C supported a culture of openness and transparency to data and presented the findings to the community.

The final cultural challenge to school districts that use data to inform decision making is the value of humility. "He or she who controls the data controls the agenda." Staff

members within educational organizations who work with data need to be humble in their approach to data and be willing to share data and information unselfishly to support the important work of school districts in accomplishing their strategic goals. The central administration expert at School District C was very unselfish in his work with school principals. He tirelessly shared data in easy to understand data visualizations that supported the important work of school principals. Yet, within organizations there are individuals who not as unselfish in sharing important data and information. For example, staff that is in charge of student information data may not be willing to share this data in ways that support the work of staff in the department of curriculum and instruction. Humility in the use of data is a very real challenge for school districts.

Building Organizational Capacity

Building the organizational capacity to use data to support data-informed decision making is an important challenge faced by school districts. Again, school districts need the organizational capacity to collect, organize, manage, visualize, analyze, and apply data to inform key district questions. Yet building the organizational capacity of school districts can be hampered by several key factors. Lack of leadership at the board or superintendent level can impede system-wide implementation of data-informed improvement. Evidence was not found for strong leadership at the Board or Superintendent level within School District A resulting in strong but sporadic implementation of data-informed processes within the district. To some extent, the data-informed decision-making model was isolated within one school in the district without the requisite leadership to disseminate the model to all schools within the district.

A second key factor that impedes the ability of school districts to build the organizational capacity to effectively use data is the lack of availability of high quality assessments aligned to the instructional targets and standards of the school district. Many of the school districts were forced to use norm-referenced tests in a criterion referenced way. Although school districts, worked diligently to derive subtest data from the standardized tests for the purpose of informing student progress on specific instructional targets or standards, the effort became less than satisfactory due to the misalignment between standardized subtest areas and state or district learning standards. The school districts are faced with an enormous challenge of finding, creating or adapting criterion-referenced tests that align with their local and state standards. There is also the technical challenge of developing data support tools that collect, organize and visualize the criterion-referenced test data to inform student achievement.

Staff Development

Within the domain of organizational capacity is the key function of staff development. School districts are faced with the challenge of providing staff with the staff development opportunities that help them use data to inform improvement at the school and district levels. The staff development needs to provide access to teaching and learning expertise and to provide ways to apply this expertise to data-informed school improvement. It also needs to provide participants with technical and statistical support. School districts within the study used a variety of approaches to staff development. All of the school districts participated in two-day training sessions with AASA staff. School District A than used this training as a springboard to initiate data-informed improvement at one of its schools. The model involved establishing data support teams at each of the

schools to be used in conjunction with an Effective Schools Initiative being used at each of the schools. The district then drew upon the expertise of staff at the model school to be used in staff development initiative with all of the principals within School District A. School District B designated specific data-informed staff development training days throughout the year in conjunction with data-informed initiatives within the school district for all schools. School District B also used a model of staff developing and using data teams at each of its schools.

While each of the school districts used a model for staff developing school staff in using data-informed processes within the context of district and school initiatives, there still remained the need for just-in-time technical and organizational support for district and school staff. Access to a senior researcher from CRESST and a data expert from AASA provided all teams with the just-in-time support that school districts required to move forward on data-informed initiatives.

The challenge that school districts face is the need to provide data-informed district-wide staff development to support the use of data and data support tools like QSP. It is also critical for school districts to provide specialized staff development support in technology, school improvement, statistics and the use of data, curriculum, and pedagogy. Finally, districts must have the capacity to provide just-in-time support to staff that are engaged in implementing data-informed district and school improvement projects.

Communication

Within the domain of organizational capacity is the key function of communication. School districts in the project used a variety of technology-rich and traditional means to communicate data-informed results and conclusions aligned to key district and school

improvement initiatives. School District D used a power point presentation to share the data-informed findings and conclusions of the Special Education self-study project. School District C used their Web site to share important student demographic and achievement data. School District B used a "Walk Through" communication venue that enhanced the ability of schools to share their student-based and data-informed work on the achievement of district goals.

While the districts of the Research Project demonstrated many diverse communication venues for sharing data-informed results related to district and school initiatives, there still remains a challenge to refine and enhance these communication venues. For example, the work at the middle school in School District A needs to be communicated more effectively to the other schools within the district. While School District C, effectively communicated student academic achievement data on the Web, there needs to be enhanced efforts to use the Web to communicate data-informed results and findings of specific district and school improvement projects. Accompanying the communication of project results should also include ways to celebrate and publicly reward those data-informed efforts to improve the schools and school districts.

Building Technical Capacity

School districts interested in using data-informed decision making face the challenge of building the technical capacity necessary to effectively use data to inform key district questions. There is no question that school districts require technology to collect, organize, and visualize data. School districts need the technical ability not only to collect and visualize data but also the technical ability to help manage, analyze and apply data to inform key questions. This project focused on helping school districts use the data

support tool called the Quality School Portfolio (QSP). Use of QSP requires that data be collected and formatted in ways that it can be imported into QSP.

Probably the biggest technical challenge faced by school districts is the artificial hurdles placed in front of them by test companies. McGraw Hill provides school districts with a software tool called Clarity that allows schools to view their standardized test data in a variety of report formats. However, the system does not allow the export of data into data support tools like QSP. School districts who want to export data in a row and column fashion must purchase an additional $700 module from McGraw Hill. School District D faced similar challenges in trying to export Gates McGinnity data for import into QSP. The superintendent worked with administrative and school staff to manually enter this data into QSP.

Student achievement data provided by the state also challenged the ability of school districts to accurately import data into their data support tools. The state of New Mexico changed its state test from the Terra Nova to the California Achievement Test (CAT). This change made it very difficult for school districts to align historical assessment data from the Terra Nova with the new CAT assessment data. Also the electronic formats used by states to store achievement data were problematic for school districts in the study especially the inaccuracies found in student identification numbers.

The technical ability of staff in working with all of the features of the Quality School Portfolio was a challenge for some district staff. For example, the assistant principal at a middle school in School District A wanted to use a line graph to visualize student performance on 4 separate writing assessments administered throughout the year. The line graph reporting function of QSP would only allow for the visualization of student

achievement data on a yearly basis. This QSP feature initially stymied the assistant principal in using QSP to visualize the data. With the help of a senior researcher at CRESST, she found a way to visualize term data.

A variety of data support tools existed in most of the districts including QSP. The integration of data from these multiple support tools to inform key district questions was a challenge for most school districts. For example, most updated student information data resided in SASI software at School District C. Student academic achievement data resided in the Clarity software of McGraw Hill, and the writing assessment data resided in QSP. Integration of data from these multiple data support tools proved to be a significant challenge at School District C.

Challenges Summary

The success of school districts in planning, implementing, and producing results aligned to school and district improvement initiatives have been extensively described in this article. Yet despite these impressive results, school districts face significant challenges in planning, implementing, and collecting results aligned to data-informed change. This section of the report highlighted the following challenges faced by school districts.

The ability of school districts to:

- Build and maintain a culture of data-informed improvement that includes the key values of spirit of inquiry, openness and transparency to data, and humility.
- Build and maintain the technical capacity to use data effectively in support of school and district initiatives.
- Build and maintain the organizational capacity to use data in support of school and district initiatives.
- Plan, implement, and evaluate effective staff development for using data-informed processes in support of school and district improvement.
- Improve and enhance communication venues for sharing data-informed initiatives and their results

Recommendations

Based upon the findings of this Research Project and the challenges identified, this section of the discussion identifies key recommendations aligned to the key research questions of the study and the challenges discussed previously.

Creating a data-informed culture

- Recommendation 1: Engage and inform school boards about the importance of data-informed and question-driven approaches to district improvement.
- Recommendation 2: Establish board level expectations that proposals concerning strategic initiatives and policy include a strong foundation in data.
- Recommendation 3: Promote a district climate and culture that fosters as spirit of inquiry, openness and transparency to data, and humility.

Building the school district capacity to use data-informed processes

- Recommendation 1: Insure strong data-informed and question driven elements into the district/school improvement process.
- Recommendation 2: Develop a 5-year plan for infusing data-informed and question-driven processes into district operations that begins with a focus on student performance and academic achievement.
- Recommendation 3: Build and maintain the organizational capacity to carry out data-informed inquiry within the school district.
- Recommendation 4: Build and maintain the technical capacity to carry our data-informed inquiry within the school district.

Staff Development:

- Recommendation 1: Establish data support teams at the district and school levels.
- Recommendation 2: Provide ongoing district-level and school-level staff development support for using data support tools, statistical tools, and teaching and learning opportunities to achieve specific district and school strategic goals.
- Recommendation 3: Provide just-in-time staff development support for district-level and school-level teams engaged in district and school-level improvement projects.
- Recommendation 4: Develop online opportunities to staff develop district and school staff in the use of data-informed processes for school and district improvement.

Communication:

- Recommendation 1: Plan and implement regular communication opportunities with key stakeholders to share products and results of data-informed school and district initiatives.
- Recommendation 2: Plan and implement both technology-rich and traditional opportunities to share data-informed district/school improvement results.
- Recommendation 3: Plan and implement a process for celebrating and rewarding the successful use of data to inform district and school improvement.

Future Research Questions

Based upon the findings and discussion of this report, the following research questions would prove useful for future investigation.

- How do school districts continue to build and sustain the technical and organizational capacities to use data-informed decision making?
- How do districts move from beginning levels of data-informed decision making to expert levels of data-informed decision-making?
- What are the key factors that contribute to the system-wide use of data to inform decisions at all levels within educational organizations?
- Does a data-informed decision-making process within educational organizations result in improvement in student achievement?
- To what extent does a focus on data-informed decision making detract from other important goals and responsibilities of educational organizations?
- How can educational organizations gain access to and use high quality assessments that are aligned with key instructional targets?
- What are the most effective staff development, technical and organizational support, and communication models to help implement data-informed decision-making within school districts

Summary

This paper discussed the findings of the District Data Use Research Project. Building the cultural, organizational, and technical capacities of school districts to effectively use technology and data-informed processes for improvement requires significant energy. School districts that participated in the District Data Use Research Project demonstrated measurable results in achieving district improvement. They also faced significant challenges in using data-informed processes for improvement. The assistant superintendent of School District C of the Research Project summarized how data can support improvement when he made the following statement:

> "We have created a data-informed instructional process that includes: looking at data, disaggregation of data, creation of instructional foci by grade and content based upon data, creation of timelines in which instruction occur, continuous assessment and data collection, creation of a class profile and planned interventions (enrichment, tutorial, maintenance, and re-teaching), and reflection about the process."

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Organization/Address: STUPSKI FAMILY FOUNDATION	Telephone: 650-872-4579 FAX: 650-224-2091
	E-Mail Address: bconrad3182 earthlink.net Date: 4/16/03

2 Belvedere Place
Mill Valley, CA.